Level One

MODULE 63103-02 - PIPELINE MECHANIC HAND AND POWER TOOLS

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Copies of Quick Quiz
- Module Examination
- Performance Profile Sheets
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- A variety of wrenches, including:
  - Straight pipe wrenches
  - Offset pipe wrenches
  - Strap wrenches
  - Chain wrenches
- A variety of spanner wrenches, including:
  - Pin spanners
  - Flat hook spanners
  - Adjustable hook eyes
  - Face spanners
  - Adjustable face types
- A variety of tin snips, including:
  - Right offset
  - Left offset
  - Right cut aviation
  - Left cut aviation
  - Straight cut aviation
  - Combination blade
  - Straight blade
- Pieces of sheet or plate metal, several scribers, and layout dye
- Packing pullers and stuffing boxes
- Inspections mirrors and flashlights
- Retaining ring pliers, shafts, rods, and spindles
- Taper gauge and section of pipe
- Woodruff key seaters, including one smaller than 2 inches and one 2-inch cutter
MODULE 63104-02 - PIPING AND MECHANICAL BLUEPRINT READING

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations
Performance Profile Sheets
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of your company’s policy and procedures manual
Copies of 49 CFR Part 195 (Liquid) and/or 49 CFR Part 192 (Gas)
Copies of sample P&IDs
Copies of sample machine drawings
Calculators
Enlarged copies of Figure 6

MODULE 63105-02 - TUBING, THREADED PIPE, AND HOSES

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations
Performance Profile Sheets
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of your company’s policy and procedures manual
Copies of 49 CFR Part 195 (Liquid) and/or 49 CFR Part 192 (Gas)
Several sections of tubing and a rule, outside caliper, or caliper rule
Several sections of copper, steel, stainless steel, aluminum, Monel®, Inconel®, Hastelloy®, and poly tubing
Section of tubing and a sharp pencil, colored felt tip pen, or silver marking pencil
Sections of tubing with OD and ID burrs and a tube deburring tool
Several sections of tubing and a variety of tubing cutters, including a hacksaw, a bandsaw, and snips
Spring tube bender and a section of soft metal tubing
Compression-type hand bender, table- or bench-mounted tubing bender, and several sections of tubing of different size and thickness
Pipe threader and die head
Assorted couplings, unions, bushings, and reducers
Several lengths of pipe and a variety of fittings
Pipe joint compounds, including Teflon® tape, liquid Teflon®, and pipe dope
A variety of nonmetallic hoses
Male, female, and splice push-on fittings
MODULE 63106-02 - FASTENERS

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Copies of Quick Quiz
Module Examination
Performance Profile Sheets
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of your company’s policy and procedures manual
Copies of 49 CFR Part 195 (Liquid) and/or 49 CFR Part 192 (Gas)
A variety of threaded fasteners
A variety of retainer rings and several pairs of pliers
A variety of cotter pins, including a standard pin, humped pin, clinch pin, and hitch, and a section of a shaft with holes drilled crosswise
A variety of pin fasteners and the necessary tools to install them
Several sections of insulation and a variety of insulation fasteners
A variety of threaded, nonthreaded, expandable, and nonexpandable fasteners; the appropriate tools to install these fasteners; and sections of drywall, concrete blocks, and insulation materials

MODULE 63107-02 - IDENTIFY, INSTALL, AND MAINTAIN VALVES (CTS 19.1–19.4)

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Copies of the Performance Verification for Covered Task 19
Copies of the Quick Quiz
Module Examinations
Performance Profile Sheets
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of your company’s policy and procedures manual
Copies of 49 CFR Part 195 (Liquid) and/or 49 CFR Part 192 (Gas)
Appropriate tools for assembling and disassembling various types of valves
Several valve stems, including:
  Rising stems
  Nonrising stems
  Outside screw-and-yoke stems
Gate, ball, plug, and expanding gate valves
Globe, angle, Y-type, butterfly, and diaphragm valves
Copies of a valve maintenance log
Valve packing-removal tools and a valve packing assembly
MODULE 63108-02 - IDENTIFY TYPES OF VALVE ACTUATORS/OPERATORS

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Copies of Quick Quiz
- Module Examination
- Performance Profile Sheets
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Copies of your company’s policy and procedures manual
- Copies of 49 CFR Part 195 (Liquid) and/or 49 CFR Part 192 (Gas)
- Sample equipment warranties for valve actuators
- Several copies of manufacturer’s instructions for a variety of valve actuators

MODULE 63109-02 - INSTALLING SEALS AND GASKETS

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Copies of Quick Quiz
- Module Examination
- Performance Profile Sheets
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Copies of your company’s policy and procedures manual
- Copies of 49 CFR Part 195 (Liquid) and/or 49 CFR Part 192 (Gas)
- Sample seal materials, including:
  - Buna-N
  - Leather
  - Silicone
  - Neoprene
- Plastic and elastomer compounds
- Room temperature vulcanizing seals
- A variety of O-rings and lip and oil seals
- Appropriate tools to install O-rings and lip and oil seals
- Mounting thimble, shaft, and seal
- Measuring tapes, gasket cutters, hole punches, and a variety of gasket materials, including:
  - Natural rubber
  - Ethylene propylene dieneterpolymer
  - Neoprene
  - Nitrile
  - Silicone
  - Viton
  - Gylon
Level Two

MODULE 63201-02 - INTRODUCTION TO PNEUMATIC SYSTEMS

Transparencies
Blank acetate sheets
Transparency pens
Overhead projector and screen
Felt-tip markers/chalk
Pencils and scratch paper
Module Examinations
Copies of the Quick Quiz
Performance Profile Sheets
Whiteboard/chalkboard
Appropriate personal protective equipment
Sliding-vane compressor
Air compressor and filters
Several grades of in-line mesh filters
Valve actuator
Copies of your company’s policy and procedures manual

MODULE 63202-02 - INTRODUCTION TO HYDRAULIC SYSTEMS

Transparencies
Felt-tip markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations
Copies of the Quick Quiz
Performance Profile Sheets
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Samples of various types of hydraulic fluids
Different schedules of steel pipe, including Schedule 40 and Schedule 60
Piping, tubing, and fittings
Check valves
Hydraulic pumps
Lubricants with different pour points
Glass jars
Several frozen ice packs
Cooler
Different types and sizes of strainers and filters
Hydraulic fluid
Common cylinder
Transparencies
Felt-tip markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations
Copies of Quick Quiz
Performance Profile Sheets
Overhead projector and screen
Whiteboard/Chalkboard
Appropriate personal protective equipment
Torque wrench
Torque multiplier
Hex turn flange spreader
T-handle flange spreader
Ratchet action flange spreader
Hydraulic flange spreader
Mechanic’s level
Master level
Shims
Scrap wood
Optical level
Metal tape
Bevel protractor
Universal bevel protractors
Plasti-gauge
Job blocks
Drill shanks of various sizes
Inside and outside calipers
Micrometers
Telescoping gauges
Dial indicators
Stroboscopic tachometer
MODULE 63204-02 - INSPECT AND REPAIR VALVES (CT 20, 21.2, 21.3)

Transparencies
Blank acetate sheets
Transparency pens
Overhead projector and screen
Felt-tip markers/chalk
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Copies of the Quick Quiz**
Copies of the Performance Verifications for Covered Tasks 20, 21.1, and 21.3†
Copies of 49 CFR Part 195 (Liquid) and/or 49 CFR Part 192 (Gas)
Copies of your company’s policy and procedures manual
Whiteboard/chalkboard
Slab-type gate valve
Expanding plug valve
Varieties of rigging hardware
Valve assembly

MODULE 63205-02 - MAINTAIN AND REPAIR PRESSURE LIMITING DEVICES AND RELIEF VALVES (CT 22, 23.1, 23.2, 24)

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
Several relief valves and PLDs, including:
Spring-type pressure relief valve
Boot-type relief valve
Safety valve
Rupture disc device
Control valve
Electro-hydraulic relief valve
A copy of your company’s procedures for inspecting tank pressure/vacuum breakers
Copies of the Performance Verifications for Covered Tasks 22, 23.1, 23.2, and 24†
MODULE 63206-02 - INTRODUCTION TO METERING DEVICES AND PROVERS

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Module Examinations
- Performance Profile Sheets
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
- Copies of your company policy and procedures manual
- Copies of API Chapter 4
- Mass flow meters
- A variety of orifice plates
- Several types of meters or photographs of several types of meters, including:
  - Turbine meters
  - Positive displacement meters
  - Ultrasonic meters
  - Mass flow meters
  - Coriolis-type mass flow meters
  - Vortex meters
- Sample meter factor logs
- Graph paper
MODULE 63207-02 - INTRODUCTION TO PUMPS

Transparencies
Blank acetate sheets
Transparency pens
Markers/chalk
Overhead projector and screen
Pencils and scratch paper
Module Examinations
Performance Profile Sheets
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company’s policy and procedures manual
Gears, including:
Helical
Spur
Herringbone
Samples or photographs of each type of pump, including:
Centrifugal pumps
Rotary pumps
Reciprocating pumps
Metering pumps
Copies of Figures 2 and 20

MODULE 63208-02 - INTRODUCTION TO GAS COMPRESSORS

Transparencies
Blank acetate sheets
Transparency pens
Markers/chalk
Overhead projector and screen
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Copies of Quick Quiz**
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
Copies of Figure 1 with the callouts covered
MODULE 63209-02 - INSTALL AND MAINTAIN BEARINGS

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Module Examinations
- Performance Profile Sheets
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Copies of your company’s policy and procedures manual
- Assorted plain bearings
- Assorted ball bearings
- Roller bearings
- Plain, roller, and ball flanged bearings
- One- and two-piece pillow block bearings and takeup bearings
- Bearings with various identification codes
- Used bearings, lintless rags, clean oil, 3-volt ohmmeter, Permatex® or Teflon® tape, fine-tooth file
- Plain bearings and appropriate tools for disassembling and reassembling them
- Equipment required for installing standard sleeve bearings
- A bearing that failed due to fatigue and a bearing that failed due to overload
- Bearings that have failed for various reasons
- Equipment and materials required for packing a bearing
- Equipment required for removing a bearing using a manual bearing puller
- Equipment required for removing a bearing using a press
- Equipment required for removing a bearing using the hydraulic method
- Equipment required for removing a bearing using the temperature method
- Equipment required for installing tapered roller bearings using the temperature mounting method
- Equipment required for installing a thrust bearing using the press mounting method
- Equipment required for installing spherical roller bearings using a hydraulic nut or locknut
- Split-housing pillow block bearings and equipment needed to assemble/disassemble them
- Equipment and materials for troubleshooting, removing, and repairing or replacing bearings
MODULE 63210-02 - INSTALL MECHANICAL SEALS

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations
Performance Profile Sheets
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of the Quick Quiz**
Copies of your company’s policy and procedures manual
Several types of mechanical seals
Examples of failed mechanical seals
Equipment required for removing and inspecting mechanical seals from a pump
Equipment required for installing mechanical seals on a pump

MODULE 63211-02 - MAINTAIN AND REPAIR DRIVERS

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations
Performance Profile Sheets
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of your company’s policy and procedure manual
Sample engine power ratings
Examples or photos of electric, diesel, gas, and turbine drivers
New bearings
Examples of various types of failed bearings
Access to bearings requiring replacement
Equipment required to remove and install bearings
Access to pipeline drivers
Equipment required for driver maintenance
Access to a driver requiring replacement
Equipment required to replace drivers
 MODULE 63301-02 - INSTALLING ROTATING EQUIPMENT

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Calculators
- Module Examinations*
- Performance Profile Sheets*
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
- Copies of your company policy and procedures manual
- A variety of base plates
- Installation drawings
- Sample pumps and/or motors with physical damage
- Sample base plates that are warped, damaged, or cracked
- Equipment to perform the bearing heating method
- Tools and equipment necessary to level base plates, including:
  - Jack bolts
  - Anchor bolts
  - Shims
  - Wrenches
  - Wedges
  - Hammers
  - Levels
  - Shim packs
  - Straightedges
  - Feelergauges
- Tools and materials necessary to perform clearance and interference installation, including:
  - Brass hammers
  - Key and setscrew couplings
  - Cleaning solvents
  - Shop clothes
  - Tapered shafts
  - Locking nuts
  - Micrometers
  - Nonshrink and epoxy grout
  - Forms to practice grouting
  - Tools to work the grout
MODULE 63302-02 - UNIT ALIGNMENT

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Module Examinations*
- Performance Profile Sheets*
- Copies of Quick Quiz**
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
- Copies of your company policy and procedures manual
- Calculators
- Copies of Figures 1, 2, 3, 4, 23, 24, and 25 with the titles covered
- Copies of Figure 33 with the callouts covered
- Alignment simulators
- Dial calipers
- Straightedges
- Scales
- Rules
- Feeler gauges
- Chain indicator jigs
- Dial indicators
- Graphical alignment charts
- Graph paper
- Reverse indicator plotting guides
- Sample alignment records
MODULE 63303-02 - VIBRATION ANALYSIS

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
A variety of transducers, including:
Velocity transducers
Accelerometers
Displacement transducers
A variety of vibration test equipment, including:
Meters
Oscilloscopes
Spectrum analyzers
Electronic filters
Stroboscopes
A variety of vibration recording instruments, including strip chart recorders and data collectors
Sample vibration monitoring forms

MODULE 63304-02 - MAINTAIN, TROUBLESHOOT, AND REPAIR PUMPS

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
Completed inspection reports
Sample manufacturers’ manuals, including procedures, schematics, and line drawings
Copies of Figure 13 with the callouts covered
MODULE 63305-02 - MAINTAIN, TROUBLESHOOT, AND REPAIR GAS COMPRESSORS

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Module Examinations*
- Performance Profile Sheets*
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
- Copies of your company policy and procedures manual
- Copies of Figures 1, 2, and 3 with the callouts covered
- Copies of manufacturers’ specifications for gas compressors
- Copies of manufacturers’ maintenance manuals, including recommended startup checklists
- Gas compressors on which to practice maintenance and repair techniques
- Tools and materials to repair common rotary compressor components, including:
  - Mechanical seals
  - O-rings
  - Thread caulking
  - Silicone caulking
  - Oil pumps
  - Couplings
  - Lubricant
  - Fasteners
  - Oil
  - Straightedges
- Tools and materials to repair common reciprocating compressor components, including:
  - Crossheads
  - Drive chains
  - Screws
  - Nuts
  - Dust plugs
  - Sprockets
  - Drift punches
  - Washers
  - Valve caps
  - Bolts
  - O-rings
  - Machinist’s rules
  - Lube oil pump chain sprockets
  - Sprocket setscrews
  - Woodruff keys
  - Gaskets
  - Metal files
Lubricator
Pry bars
Screwdrivers
Valve tools
Anti-seize lubricant
Valve retainer
Lubricant
Sample documentation for startup and operational checks

Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Copies of Quick Quiz**
Copies of Performance Verifications for Covered Tasks 19.6 and 21.1†
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
Sample manufacturer’s warranties
Sample preventive maintenance records and schedules
Sample equipment records
Pneumatic schematic diagrams
Sample actuators/operators and the necessary tools for disassembly and reassembly
Manufacturers’ instruction manuals for the sample actuators/operators
A variety of new and damaged gauges
Sample valve maintenance logs
Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Copies of Performance Verifications for Covered Tasks 19.7 and 21.4**
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
Sample preventive maintenance schedules
Sample maintenance records and equipment logs
Pyrometer
Clamp-on ammeter
Sample hydraulic pump with the necessary tools for disassembly and assembly
Manufacturers’ instruction manuals for the sample hydraulic pumps
Hydraulic system control valves and the necessary tools for disassembly and assembly
A variety of replacement parts for a hydraulic actuator/operator and the corresponding manufacturers’ specifications
A variety of hydraulic hoses and the necessary tools to cut them
Hydraulic schematic drawings
Copies of manufacturers’ instruction manuals for a variety of hydraulic system components
Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Copies of Performance Verifications for Covered Tasks 19.5 and 21.5**
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
Sample valve maintenance logs
Computer-generated work orders
Grease guns
Valve stems
Copies of Figure 10 with the legend covered
Tools and materials to
  Apply external and internal lubricants
  Disassemble bolt-on and machine-fitted spur-gear attachments
  Remove worm gear assemblies
Tools and materials to disassemble and assemble
  Single reduction worm gears
  Actuator/operator bearing assemblies
  Bevel gear actuator/operators
Lubricants
Brushes
Cleaning solvents
Shop cloths
Sample P&IDs
Inspection checklists
Bolt-on and machine-fitted spur gear attachments
Manufacturer’s instruction manuals for limit switches
Torque switch
Stem nut assembly
Transparencies
Markers/chalk
Blank acetate sheets
Transparency pens
Pencils and scratch paper
Module Examinations*
Performance Profile Sheets*
Overhead projector and screen
Whiteboard/chalkboard
Appropriate personal protective equipment
Copies of 49 CFR Part 192 (Gas) and/or 49 CFR Part 195 (Liquid)
Copies of your company policy and procedures manual
API Manual of Petroleum Measurement Standards
Typical strainer assembly
Tools and materials to clean a typical strainer assembly and to disassemble a turbine meter
Meter clearance records
Practice meters
Appropriate measuring gauges
Components of a disassembled positive displacement meter
Materials to clean positive displacement meter components
Proving spheres
Calipers
Sizing rings
Steel tape